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ORIGINAL
FILE

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Section 90.239 of the	)	RM-8013
Commission's Rules to Adopt Permanent	)	
Regulations for Automatic Vehicle	)	
Monitoring Systems	)	

TO: The Commission

OPPOSITION TO PETITION FOR RULEMAKING

AMTECH Corporation

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SUMMARY

AMTECH Corporation (AMTECH) opposes the Petition for Rulemaking filed by PacTel Teletrac (PacTel). PacTel requests a change in the Commission's rules governing automatic vehicle monitoring (AVM) systems in the 902-928 MHz band that would give PacTel and one other system exclusive rights to eight MHz of that spectrum (each), eliminating the current shared service regime. In effect, PacTel urges the FCC to preclude the operation of systems employing technology other than that similar to its own at 904-912 and 918-926 MHz.

By virtually eliminating competition and multiple entry in the band, adoption of such a proposal inevitably would chill the development of AVM technology and hamper the growth of AVM services. Thus, under Section 7 of the Communications Act, PacTel bears the burden to show that its plan would be in the public interest. PacTel fails to meet this burden, for numerous reasons.

First, there are other types of AVM systems in the marketplace that would be displaced under PacTel's scheme. AMTECH's system, for example, serves important user needs in numerous industries, including (1) traffic management and highway toll; (2) railroads; (3) trucking; (4) intermodal shipping; and (5) air transport. Standards bodies in many of those industries have prescribed the type of technology upon which AMTECH relies. Already, AMTECH and its customers have installed far more

operating systems than has PacTel. Although PacTel apparently serves fewer than 6,000 customers, AMTECH tags are installed on approximately 400,000 vehicles (including mobile equipment) today. Many more can soon be expected with the recent implementation of the North American railroad standard -- mandatory for over 1.4 million rail cars -- and other user industry standards plus authorization of new intelligent highway-vehicle systems (IVHS).

Second, the FCC's two-decade-old AVM rules were designed to be flexible to facilitate the maximum development of technology. Although PacTel largely ignores this policy, it is clear that, not knowing how AVM systems would develop, the Commission instituted a shared spectrum, multiple entry arrangement that would permit the marketplace to choose the appropriate AVM configurations and services, policies now enshrined in Section 332 of the Act. As part of that adaptability, for more than five years, AMTECH and its customers have been licensed in the so-called "wideband" (904-912 and 918-926 MHz) portion of the 902-928 MHz spectrum that PacTel proposes to reserve for systems like its Teletrac service. PacTel's proposal would eliminate these flexibilities, giving PacTel alone one half of a new AVM duopoly in stark contrast to the Commission's historically adaptable AVM policies.

Third, whether PacTel likes it or not, the AVM band is and will continue to be shared. AVM does not have priority: it is secondary to relatively high-powered industrial, scientific and medical equipment and government radiolocation. Moreover, the band also co-exists with several secondary allocations -- amateur services and numerous Part 15 devices -- that would likely prove very incompatible with the type of

operation PacTel proposes. Given that PacTel's own engineering exhibits emphasize the fragility of its system, the Commission should inquire whether, even if afforded exclusivity and freedom from competition, PacTel's system could meet the needs PacTel claims it will serve.

Fourth, PacTel ignores additional federal policies supporting other, competitive systems such as AMTECH. Recent policy directives by the Department of Transportation have affirmed the need for the AVM services such as AMTECH provides. More recent legislation -- the Intelligent Highway-Vehicle Act of 1991 -- establishes new U.S. goals to develop highway toll, intermodal and IVHS system operations of the type AMTECH is already providing. Thus, not only would grant of PacTel's Petition constrain new technologies and services in contravention of FCC policy and the Communications Act, it would conflict with these other federal policies as well.

Fifth, and contrary to the Petition's claims, adoption of PacTel's proposed rules would retard, not accelerate, growth in the AVM marketplace. Simply put, PacTel asserts that future of AVM service demands that the agency replace a shared, multiple entry environment with a protected service duopoly. PacTel's scheme would retroactively lock-in its technology, to the exclusion of others, and require the user public to forego the benefits of open market competition. Although this may serve PacTel's narrow business interests, PacTel provides no proof that it comports with the public interest.

Sixth, granting of a service duopoly would benefit only a favored few. Beyond PacTel and Ameritech, the licensees of apparently identical systems, virtually no other service provider will be permitted to enter the market. Thus, it appears that PacTel's first foray into a competitive information services marketplace, less than a year after the MFJ line of business restrictions were lifted, presupposes securing the same sort of monopoly power PacTel currently enjoys in local exchange services. Indeed, its anti-competitive intent is plain from PacTel's action in "warehousing" hundreds of frequencies across the country -- through a generous extended implementation schedule -- then seeking retroactive protection for the licensed, but unbuilt, systems.

Finally, because PacTel's petition would establish its system as the AVM baseline, the public would be stuck with a poorly designed, inefficient technology. In fact, PacTel's own materials make plain that its request for exclusive spectrum is a regulatory fix to cure technological weaknesses. PacTel has used a spread spectrum, code division system -- technologies designed to operate in noisy, multiple-entry environments -- that is so fragile that even low power co-channel signals destroy PacTel's accuracy and capacity. AMTECH's system, by contrast, was designed to tolerate interference from systems such as PacTel and the many other users of the 902-928 MHz band. Moreover, PacTel requests an additional 250 kHz for what amounts to a paging channel despite the fact that PacTel Paging already holds licenses for numerous paging services.

If the FCC nonetheless were to reexamine its AVM rules, AMTECH suggests that, rather than adopt PacTel's anti-competitive proposal, the Commission clarify the

obligation of all AVM providers to cooperate mutually in good faith -- as PacTel and AMTECH have done to date -- to reduce mutual interference. Moreover, AMTECH agrees with PacTel's suggestion to permit non-developmental licensing in the 903-904 and 926-927 MHz bands and to broaden the definition of AVM to cover more than merely the location of vehicles. Finally, AMTECH suggests that the Commission explore giving all AVM licensees access to the entire 902-928 MHz spectrum, including 912-918 MHz. This would permit PacTel and others to spread their signals over a wider range as well as provide flexibility for technologies such as AMTECH's.

In sum, PacTel's plan would replace open entry and sharing in a competitive marketplace with a government sponsored AVM duopoly. Because this scheme inevitably would restrict the development of AVM technology and services, PacTel has failed to prove -- as it must under Section 7 of the Communications Act -- that its proposal is in the public interest. Accordingly, AMTECH requests that the Commission dismiss or deny PacTel's Petition.

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OPPOSITION TO PETITION FOR RULEMAKING

Pursuant to Section 1.405 of the Commission's Rules,[1] AMTECH Corporation, by its attorneys, hereby comments on the above-captioned petition for rulemaking filed by PacTel Teletrac (PacTel). Simply put, PacTel -- only recently authorized to provide information services -- would enshrine its own technology as a virtual monopoly, to the exclusion of other new methods and services in the spectrum currently allocated for automatic vehicle monitoring (AVM) systems. Under Section 7 of the Communications Act, however, PacTel bears the heavy burden of proving that the relief it requests would not impede the development of other new systems, technologies, and service offerings. PacTel has failed to meet this burden; in fact, grant of its petition would actually retard progress in the marketplace for AVM systems, imperiling the further development and deployment of AMTECH technology that already serves over 400,000

[1] 47 C.F.R. § 1.405 (1991).

that already serves over 400,000 vehicles (including transportation equipment), with more than 600,000 tags already purchased. Accordingly, AMTECH opposes the PacTel petition and requests that it be dismissed or denied.

I. PACTEL'S PETITION FOR RULEMAKING

On May 28, 1992, PacTel and its joint venture partner Location Technologies, Inc., filed a petition requesting that the Commission launch a rulemaking to revise comprehensively Section 90.239 of the Commission's rules relating to AVM.[2] PacTel is the successor in interest to North American Teletrac, which in the 1980s developed a location system for vehicles. Although PacTel acquired control of the transmission portion of the company through equity investment several years ago,[3] the Teletrac system is only in its initial stage of planned nationwide implementation and, to AMTECH's understanding, likely serves fewer than 6,000 customers.

Albeit with little supporting evidence, PacTel contends in its petition that the existing rules inadequately address certain aspects of current AVM systems and, in particular, fail to make adequate provision for the avoidance of intersystem interference. PacTel argues that the alleged flaws limit AVM innovation and

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[2] North American Teletrac and Location Technologies, Inc., Petition for Rulemaking, RM-8013 (filed May 28, 1992). The Commission gave public notice of the petition a few weeks later. Public Notice Report No. 1897 (June 23, 1992).

[3] Shortly after it filed its Petition, PacTel purchased the company outright. Communications Daily at 8 (May 29, 1992).

discourage investment in AVM technology. PacTel suggests that only the Commission action it proposes can adequately permit full use of the 902-928 MHz spectrum.

PacTel's proposal to correct these asserted defects has two principal components. First, and most importantly, PacTel proposes that the Commission grant it exclusive access to 8 MHz (40 percent) of the AVM spectrum, plus a 250 kHz polling channel.[4] This would give PacTel monopoly rights covering hundreds of markets throughout the country using more spectrum than the Commission is considering for high-profile services such as HDTV. Second, PacTel proposes that the Commission sharply distinguish between what PacTel calls "wideband" and "narrowband" AVM systems, which the agency rightfully has never done. Pactel would classify AMTECH's system as narrowband and relegate it to much smaller portions of the spectrum.

Despite the alleged deterrence of the existing rules, AMTECH is an AVM innovator and investor now providing services and equipment throughout the U.S. and the world. In fact, precisely because of the flexibility of the current rules, AMTECH and other companies have successfully developed and marketed several 902-928 MHz AVM technologies. Changing those rules as PacTel would have it, by eliminating sharing and reducing the amount of spectrum available to all systems, would undermine existing marketplace development and cause the public to forego many of the benefits AVM technology now promises.

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[4] PacTel Petition at 26-32. PacTel does propose to grandfather existing users. PacTel Petition at 35-36.

II. STATEMENT OF INTEREST AND DESCRIPTION OF AMTECH

A. Background

AMTECH is the worldwide leader in the manufacture of automatic vehicle monitoring devices for transportation applications. Headquartered in Dallas, AMTECH also has research and development and engineering and manufacturing facilities in Albuquerque and Santa Fe, New Mexico. AMTECH's products are designed and manufactured in the United States, but AMTECH's market is global.

AMTECH technology is used for automatic toll collection and is a critical component of the intelligent vehicle-highway system (IVHS) programs.[5] AMTECH's technology also is used to track rail cars, trucks and intermodal freight.[6] The technology pioneered by AMTECH provides the basis for broad industrial use and is specified and endorsed by a host of user industry standards organizations, such as the Association of American Railroads (AAR), the American Trucking Associations (ATA), the American National Standards Institute (ANSI), the International Standards Organization (ISO). Furthermore, the State of California has recently adopted an AVM specification, consistent with AMTECH's technology, designed for millions of motorists using that state's highways. AMTECH's service to each of these transportation industries and its relation to each of the standards established by the

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[5] See infra for a discussion of IVHS.

[6] For a description of intermodal containers, see infra.

identified organizations is explained below. At present, AMTECH systems are serving over 400,000 vehicles (including transportation equipment), nearly all of which rely on AMTECH AVM on a daily basis.

AMTECH is an ideal example of how effective technology transfer from the public sector advances the public interest through job creation and beneficial application of technology. Initial development of the AMTECH electronic identification technology began in 1972 as a research project at the Los Alamos National Laboratory in New Mexico. Over the next several years, various breakthroughs were achieved by the Los Alamos team, which was focusing on the government radiolocation band at 902-928 MHz. Following a technology transfer from the Department of Energy in 1984,[7] several scientists and engineers left Los Alamos to develop additional, commercial applications for the technology.

In the crucible of the marketplace, AMTECH scientists developed and refined a product for commercial use. This required significant additional effort and personnel. AMTECH now employs over 200 scientists and engineers as well as manufacturing, marketing and software development personnel that continually seek to improve its system. It has offices, representatives and systems installed in 14 countries and nearly 4 dozen marketing and distribution agreements with established companies covering the

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[7] Such technology transfers are consistent with national policy to rely wherever possible on private sector technological development. See Intelligent Vehicle-Highway Systems Act of 1991, Pub. L. No. 102-240, § 6052(b)(8), 105 Stat 2189, 2190, § 6052(b)(8), codified at 23 U.S.C. § 307 note (Supp. III 1991) (establishing a Federal policy to facilitate "the transfer of transportation technology from national laboratories to the private sector.").

entire world. The company has been publicly held since November 1989, with more than a $65 million public equity investment. AMTECH is now ranked as number 15 on Inc. magazine's list of the 100 fastest growing public companies and rated the second fastest growing U.S. export company by International Business magazine.

AMTECH is truly an American success story. Thus far, AMTECH's success has been grounded on its superior technology.

B. Technology

AMTECH's automatic vehicle monitoring technology permits remote identification of, and communication with, vehicles through radio frequency signals. AMTECH holds a broad portfolio of intellectual property protection covering its system design and software, including patents that apply directly to methods of obtaining range information.

In general, the AMTECH system has two components: a "reader" and a "tag." The reader consists of an RF Module, antenna, and connections to digital processing equipment. The RF module transmits a low-level radio frequency signal using a power level and antenna designed to control coverage area, always under 500 feet. The tag is an RF passive device.[8] Tags do not transmit radio signals; they contain no intentionally radiating oscillators. The tag is completely silent, i.e., emits no RF

[8] Some tags have an internal power source; these battery powered tags have a longer range than do "beam" powered tags since they need not employ any of the received signal energy to power the on-board microprocessor. Like beam powered tags, however, they do not have any radio frequency transmitter.

energy, when not in the presence of the illuminating signal. However, each tag may be programmed to carry information concerning the object to which the tag is attached.[9]

Signals transmitted by the reader are reflected back by the tag. The reflectivity of the tag antenna can be controlled digitally, by varying the efficiency of the antenna. Information stored in the tag's memory is thus used to modulate[10] the tags's reflection. This technology of reflecting energy back to a receiving unit is often described as "modulated backscatter."

The reflected signal is received and demodulated by the RF Module's homodyne radar receiver. The reader recognizes tags by identification of the signals. The demodulated and amplified signals are passed to the reader for processing. Once data have been retrieved by the system, they must be made useful for the particular application. AMTECH's software gathers, stores, and packages the data, then forwards it for processing. The AMTECH Response Center in Dallas can monitor remotely the data collection process at most of its installations.

Although AMTECH readers and RF Modules are approximately the size of a briefcase, AMTECH tags can be as small as a credit card.[11] A diagram showing how a typical AMTECH installation operates is contained in Figure 1 below.

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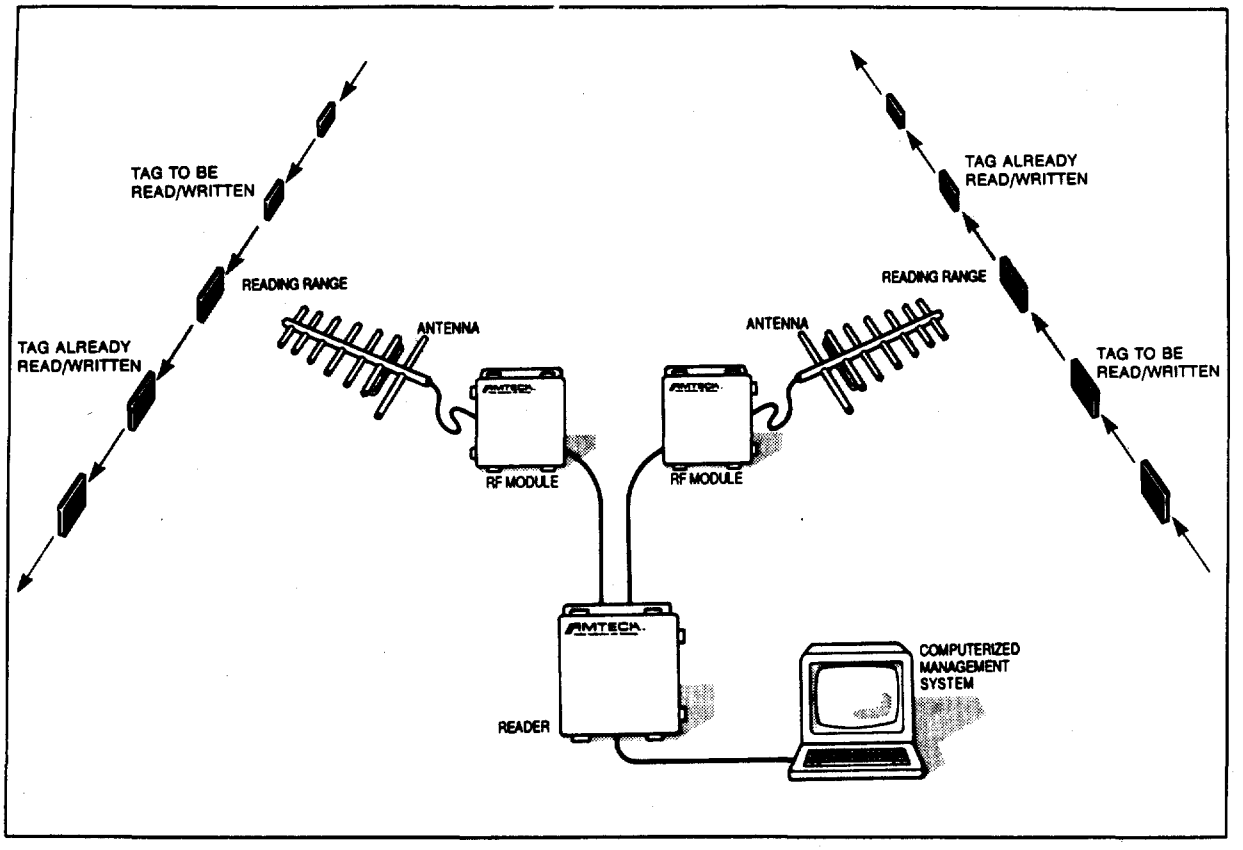
[9] Many tags are pre-programmed. Other systems use "read-write" tags whose memory can be modified dynamically by the reader system.

[10] AMTECH's system uses phase and/or amplitude modulation.

[11] AMTECH manufactures various models with a range of sizes and shapes.

Figure 1

AMTECH AVM CONFIGURATION



The benefits of this type of technology are enormous. The tags are relatively simple in design and, thus, economical. Because the tags do not radiate signals unless illuminated, they do not add to background electromagnetic noise levels and cannot interfere with other radio devices such as mobile telephones. The reading zone can be carefully controlled -- far easier than with tags that transmit -- resulting in reliable

operations in critical applications. Tag discrimination is precise, and tag detection can be reliably accomplished even in situations where the population of tags is dense (at an automobile toll plaza, for example, as discussed below).

Depending on the type of application, AMTECH's AVM technology uses varying amounts of spectrum. Any single reader in a read-only system requires approximately 20 kHz for its transmission. In a typical installation, this signal is transmitted at approximately 2 watts effective radiated power (ERP) or less.[12] The tag's modulated reflection is spread over a wider bandwidth; the occupied bandwidth is approximately 2.5 MHz and the necessary bandwidth is about 800 kHz. It should be noted, however, that because the tag is merely a passive reflector, a typical tag reflects less than 300 *microwatts*.

Most sites require two separate readers using different frequencies, and some installations have as many as 18 readers. Reliable operation of multiple readers within a given area requires that readers be separated in frequency and in some cases time multiplexed to avoid mutual interference. Specifically, when readers are relatively close, separations of at least 2 MHz are desirable between any adjacent reader. Moreover, applications calling for high data rates, such as the recent California specification, require emissions of greater bandwidth. Thus for toll plazas, intermodal terminals, rail switch yards and multiple, high speed applications such as highways, the

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[12] The maximum ERP is less than 30 watts. Powers this high are employed where longer reading range is needed (e.g., certain rail, highway and intermodal environments). Typically, however, the power at a site is adjusted downward to reduce mutual interference potential.

AMTECH technology requires access to several megahertz of spectrum, albeit at an extremely low power.

The AMTECH system is relatively "simple" in terms of operation and design, in that frequency and power levels are set by the readers (relatively few in numbers compared to tags). At the same time, the tags can be designed to be "frequency agile" so that they respond to a variety of reader signal frequencies. For example, some models of AMTECH tags are capable of responding to reader signals ranging from 850-950 MHz, permitting them to be read in other countries while complying with individual national frequency and power regulations.[13]

Finally, the AMTECH technology is designed to be compatible with other uses of the band. During experimentation and actual experience with nearby ISM products, Part 15 devices, and government radiolocation systems, AMTECH has never experienced debilitating interference from co-frequency users. Moreover, the AMTECH technology is unlikely to receive interference from hyperbolic multilateration (HML) systems such as PacTel's. To date, AMTECH installations have received no interference from operating Teletrac systems.[14]

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[13] Other tags -- particularly intermodal tags -- are designed for dual operation at 902-928 MHz and in the ISM band at 2400-2500 MHz to meet other foreign requirements. Because of technical limitations, such tags are battery powered.

[14] AMTECH systems are operating in some cities where PacTel already offers service, most notably Los Angeles, where AMTECH units installed in LA International Airport were not affected adversely by co-frequency Teletrac emissions. As noted infra, AMTECH has worked to avoid operations that could degrade the performance of PacTel's system.

C. Applications of AMTECH Technology and Success to Date

AMTECH's AVM technology is designed to be useful in a variety of differing applications. Attachment A presents a description of the industries selected AMTECH systems are serving and the recent actions of domestic and international standards bodies to adopt AMTECH technology for use in various business contexts. Provided below is a brief summary of that information.

At present, AMTECH products have made significant contributions in five industries: (1) traffic management and highway toll collection; (2) rail transport; (3) intermodal container transport; (4) trucking and fleet management; and (5) air transport.[15] Several states and turnpike authorities have turned to AMTECH to automate highway tolls, providing cashless, often high-speed vehicle identification and toll collection.[16] Already, AMTECH tags have been installed on over 250,000 automobiles and trucks generating over 150,000,000 toll transactions annually and are often used daily.

Moreover, newer programs, called intelligent vehicle-highway systems (IVHS), will use AMTECH systems to modify road signs, collect traffic data, change routing

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[15] Other potential applications for the future are discussed in Attachment A hereto.

[16] See, e.g., Attachment B hereto, consisting of a copy of the Letter of Richard L. Ridings, Chief Executive Officer, Oklahoma Turnpike Authority, to Donna R. Searcy, Secretary, Federal Communications Commission, dated July 15, 1992; Attachment C hereto, consisting of the Letter of John B. Ramming, Executive Director, Texas Turnpike Authority, to Donna R. Searcy, Secretary, Federal Communications Commission, dated July 17, 1992; and Attachment D hereto, consisting of the Letter of Alan J. LeVasseur, Executive Director, State of Louisiana, Department of Transportation and Development, Crescent City Connection Division, to Donna R. Searcy, Secretary, Federal Communications Commission, dated July 17, 1992.

and thus, further manage and minimize traffic congestion. The State of California has already determined to implement a statewide vehicle identification system and has promulgated regulations mandating modulated backscatter techniques for AVM.[17] The California Department of Transportation will shortly release a request for proposals (RFP) for statewide implementation on toll lanes and bridges and anticipates using the system to manage and monitor traffic flow -- in short, IVHS -- as well.

AMTECH systems are already installed on over 100,000 rail cars and are used by railroads to manage mobile rail stock. Under a standard recently promulgated by the Association of American Railroads (AAR), all North American freight cars -- more than 1.4 million -- must be equipped with two AMTECH tags by 1995. The AMTECH system will permit precise tracking of rail cars and locomotives as they travel past three to five thousand planned reader sites on 220,000 miles of track throughout the continent.[18] Moreover, AMTECH technology may soon be employed for automatic train control (ATC); already ATC projects using AMTECH systems are underway in Europe and Australia.

Most long distance and international shipping today is accomplished through intermodal containers that can be carried by truck, rail, ship or plane. AMTECH technology is used to track such objects to improve efficiency, provide automated

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[17] Cal. Sts. & High. Code §§ 27564, 27565 (West 1992).

[18] The automatic equipment identification (AEI) program is a key part of a strategy being implemented by the North American railroads to maintain their long-term domestic and global competitiveness. To that end, the total investment in AEI technology by such railroads is projected to be $300-500 million.

billing, and enhance safety. The goal is to establish a "seamless" flow of containers through various media of transportation, capable of being monitored at any stage of shipment. As discussed in detail in Attachment A, both the American National Standards Institute (ANSI) and the International Standards Organization (ISO) recently have adopted AVM standards fully compatible with AMTECH technology for domestic and international shipping, respectively. Intermodal carriers and shippers have installed tens of thousands of AMTECH tags. AMTECH believes that many of the world's 4.5 million intermodal containers will be tagged within the next decade.

Trucking companies and other firms operating fleets use AMTECH technology to track and identify tractors, trailers and the containers being shipped. Some companies install AMTECH readers in loading yards, to identify and bill incoming vehicles. Others use AMTECH systems for controlling vehicular access to, for example, parking lots and military bases. Two years ago, the American Trucking Associations (ATA) adopted an AVM standard that is compatible with AMTECH equipment (and also with the AAR and ANSI intermodal standards). The two largest interstate trucking firms, J.B. Hunt and Schneider, are equipping their entire fleet of 10,000 trucks. In total, over 40,000 trucks are AMTECH equipped thus far.

Finally, AMTECH systems have many applications in and around airports. In addition to their use on shipping containers, AMTECH tags have been installed on aircraft pallets and to control vehicular access to secure areas. The AMTECH technology also is used to streamline taxi queues, decreasing airport congestion and

automatically assessing any user fees for taxis and other vehicles.[19] The International Air Transport Association (IATA) has adopted a recommended practice covering AMTECH equipment for aircraft pallets. At present, several domestic and international airports, including LAX, JFK, DFW and several in Japan, rely on AMTECH installations every day.

In light of this growth, AMTECH expects to increase its transponder tag shipments to 100,000 per month. But, AMTECH's success is not merely confined to the United States. As listed in Attachment A page 11-14, AMTECH technology has been proven around the globe. Thus, in addition to contributing to the safe and efficient management of mobile resources, AMTECH's AVM system is a unique export opportunity for U.S. businesses. In 1991, approximately 26 percent of AMTECH's sales were to customers outside the United States.

Promotion of international sales of such high-technology components are critical to improving the United States trade deficit. AMTECH has already had remarkable success in this area. Ironically, any cloud over the U.S. regulatory treatment of automatic vehicle monitoring equipment could undercut the ability of U.S. companies such as AMTECH to sell such equipment overseas.

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[19] See e.g., Attachment E hereto, consisting of the Letter of Richard L. Hill, President, Avtech Systems Corporation, to Donna R. Searcy, Secretary, Federal Communications Commission, dated July 15, 1992.

III. THE BACKGROUND OF THE AVM RULES AND AMTECH'S REGULATORY EXPERIENCE IS INCONSISTENT WITH PACTEL'S CLAIMS

A. The Prime Objective of the 1974 Allocation and Existing AVM Rules Was To Facilitate the Flexible Development of AVM Technology

Although PacTel's petition affirms the need for "flexibility," the relief it seeks would narrow dramatically the types of services that are permitted access to the majority of the AVM allocation. Indeed, PacTel's request is at odds with the Commission's essential purpose in establishing AVM.

Discussion of AVM policies began less than 25 years ago. The "interim" AVM rules were promulgated in 1974, when AVM technology was in its infancy. Not surprisingly, because the market was undefined, the Commission wisely sought to foster the continued development of the full scope of AVM techniques through a flexible, shared approach to licensing. The public interest was well served by this decision.

On August 21, 1968, the Commission instituted an inquiry in Docket 18302 to investigate AVM techniques and potential regulatory responses.[20] At the same time, to further the purposes of the inquiry, the agency decided that the AVM system designs then under study should have an opportunity to test their approaches. Accordingly, the

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[20] See Automotive Vehicle Locator Systems, 35 F.C.C.2d 692, 692 (1972) (Further Notice).

Commission included provisions, at the time Docket No. 18302 was instituted, to permit the licensing of AVM systems on developmental and experimental bases.[21]

The original notice of inquiry sought information on the status and types of AVM operations, the spectral and operational requirements for such systems, and the possible approaches to license AVM operations.[22] Despite receiving "a significant body of data," the Commission concluded that "the state of development of vehicle location systems had not progressed sufficiently [as of that time] to permit conclusive findings and recommendations as to [its] inquiries."[23]

In mid-1972, partly in response to pilot programs supported by federal agencies,[24] the Commission determined to reopen Docket 18302.[25] The FCC hoped to determine if the AVM industry had progressed sufficiently to warrant authorization on a regular basis. The Commission also decided to consider a proposal for systems claiming a need for 10 MHz wide assignments in the 902-928 band, noting, however, that it was not at all clear "whether the goals of [such a] system are practical or

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[21] Id.

[22] Id. at 692-93.

[23] Id. at 693.

[24] The governmental sponsors included the Department of Transportation and the Department of Housing and Urban Development.

[25] Further Notice at 694.

necessary as opposed capability of AVM systems in other frequency bands or of other design."[26]

The Further Notice explains the state of the nascent AVM industry in the early 1970s:

> Although we are giving consideration to rule changes which provide for AVM systems operations in the 902-928 MHz band, there remain a number of unresolved questions, including those already suggested, both as to these proposed operations and as to systems being developed in other frequency bands and utilizing different techniques.. . . All of these operations, as well as the proposals for 902-928 MHz band systems, require our careful examination before final action can be taken as to required rule provisions for AVM systems.[27]

Accordingly, the Further Notice raised numerous questions about anticipated AVM systems and capabilities.[28]

In August of 1974, the Commission adopted rules for AVM systems.[29] The agency found that commenters generally had encouraged the Commission to adopt "a liberal approach [in its AVM rules] for the unrestricted development and use of a variety of AVM techniques."[30] In adopting the rules, the Commission, stated that it

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[26] Further Notice at 694 (emphasis added).

[27] Id. at 695 (emphasis added).

[28] Id. at 696.

[29] Automotive Vehicle Locator Systems, 39 Fed. Reg. 28,881 (1974) (Interim Order).

[30] Interim Order at 28,881, ¶ 4.